ELECTRONICS AND COMMUNICATION ENGINEERING 2022 Scheme	
Course Code	**22BBEE103/203- Basic Electronics**
CO1	Develop the basic knowledge on construction, operation and characteristics of semiconductor devices
CO2	Apply the acquired knowledge to construct small scale circuits consisting of semiconductor devices
CO3	Develop competence knowledge to constructbasic digital circuitby make use of basic gate and its function
CO4	Construct the conceptual blocks for basic communication system
CO5	Apply the knowledge of various transducers principle in sensor system
Course Code	**22BMATEC301 - AV Mathematics-III for EC Engineering**
CO1	Demonstrate the Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing, and field theory
CO2	To use Fourier transforms to analyze problems involving continuous-time signals
CO3	To apply Z-Transform techniques to solve difference equations
CO4	Understand that physical systems can be described by differential equations and solve such equations
CO5	Make use of correlation and regression analysis to fit a suitable mathematical model for statistical data
Course Code	**22BEC302 - Digital System Design using Verilog**
CO1	Simplify Boolean functions using K-map and Quine-McCluskey minimization technique
CO2	Analyze and design for combinational logic circuits.
CO3	Analyze the concepts of Flip Flops(SR, D,T and JK) and to design the synchronous sequential circuits using Flip Flops
CO4	Model Combinational circuits (adders, subtractors, multiplexers) and sequential circuits using Verilog descriptions.
Course Code	**22BEC303 - Electronic Principles and Circuits**
CO1	Understand the characteristics of BJTs and FETs for switching and amplifier circuits
CO2	Design and analyze amplifiers and oscillators with different circuit configurations and biasingconditions
CO3	Understand the feedback topologies and approximations in the design of amplifiers and oscillators
CO4	Design of circuits using linear ICs for wide range applications such as ADC, DAC, filters and timers.
CO5	Understand the power electronic device components and its functions for basic power electronic circuits
Course Code	**22BEC304 - Network Analysis**
CO1	Determine currents and voltages using source transformation/ source shifting/ mesh/nodal analysis and reduce given network using star delta transformation
CO2	Solve problems by applying Network Theorems and electrical laws to reduce circuit complexities and to arrive at feasible solutions.
CO3	Analyse the circuit parameters during switching transients and apply Laplace transform to solve the given network

CO4	Evaluate the frequency response for resonant circuits and the network parameters for two port networks
Course Code	**22BECL305 - Analog and Digital Systems Design Laboratory**
CO1	Design and analyze the BJT/FET amplifier and oscillator circuits
CO2	Design and test Opamp circuits to realize the mathematical computations, DAC and precision rectifiers
CO3	Design and test the combinational logic circuits for the given specifications
CO4	Test the sequential logic circuits for the given functionality
CO5	Demonstrate the basic circuit experiments using 555 timer
Course Code	**22BEC306C - Computer Organization and Architecture**
CO1	Explain the basic organization of a computer system
CO2	Describe the addressing modes, instruction formats and program control statement
CO3	Explain different ways of accessing an input/ output device including interrupts
CO4	Illustrate the organization of different types of semiconductor and other secondary storage memories
CO5	Illustrate simple processor organization based on hard wired control and microprogrammed control.
Course Code	**22BEC358C - C++ Basics**
CO1	Write C++ program to solve simple and complex problems
CO2	Apply and implement major object-oriented concepts like message passing, function overloading, operator overloading and inheritance to solve real-world problems.
CO3	Use major C++ features such as Templates for data type independent designs and File I/O to deal with large data set
CO4	Analyze, design and develop solutions to real-world problems applying OOP concepts of C++
Course Code	**22BEC401 - Engineering Electromagnetics**
CO1	Evaluate problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume.
CO2	Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume Charge distribution by using Divergence Theorem.
CO3	Determine potential and energy with respect to point charge and capacitance using Laplace equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for different current configurations
CO4	Calculate magnetic force, potential energy and Magnetization with respect to magnetic materials and voltage induced in electric circuits.
CO5	Apply Maxwell's equations for time varying fields, EM waves in free space and conductors and Evaluate power associated with EM waves using Poynting theorem
Course Code	**22BEC402 - Basic Signal Processing**
CO1	Understand the basics of Linear Algebra
CO2	Analyze different types of signals and systems
CO3	Analyze the properties of discrete-time signals & systems
CO4	Analyze discrete time signals & systems using Z transforms
Course Code	**22BEC403- PRINCIPLES OF COMMUNICATION SYSTEMS**
CO1	Understand the amplitude and frequency modulation techniques and perform time and frequency domain transformations
CO2	Identify the schemes for amplitude and frequency modulation and demodulation of analog signals

	and compare the performance
CO3	Characterize the influence of channel noise on analog modulated signals.
CO4	Define the schemes for sampling, pulse amplitude modulation and pulse code modulation systems
CO5	Design of circuits used in different stages of communication transmitters and receivers
Course Code	**22BECL404 - Communication Laboratory**
CO1	Understand the basic concepts of RF transmitters and Receivers
CO2	Illustrate the AM and FM modulation generation and detection using suitable electronic circuits
CO3	Design and test the sampling, Multiplexing and pulse modulation techniques using electronic hardware
CO4	Design and Demonstrate the electronic circuits used for RF transmitters and receivers
Course Code	**22BEC405A - 8051 MICROCONTROLLER**
CO1	Explain the difference between Microprocessors & Microcontrollers, Architectureof 8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of 8051.
CO2	Write 8051 Assembly level programs using 8051 instruction set
CO3	Explain the Interrupt system, operation of Timers/Counters and Serial port of 8051.
CO4	Write 8051 Assembly language program to generate timings and waveformsusing 8051 timers, to send & receive serial data using 8051 serial port and to generate an external interrupt using a switch
CO5	Write 8051 C programs to generate square wave on 8051 I/O port pin using interrupt and to send & receive serial data using 8051 serial port. Interface simpleswitches, simple LEDs, ADC 0804, LCD and Stepper Motorto 8051 using 8051 I/O ports
Course Code	**22BEC456A - Embedded C Basics**
CO1	Write C programs in 8051for solving simple problems that manipulate input data using different instructions.
CO2	Develop testing and experimental procedures on 8051Microcontroller, analyze their operation under different cases.
CO3	Develop programs for 8051Microcontroller to implement real world problems
CO4	Develop microcontroller applications using external hardware interface

ELECTRONICS AND COMMUNICATION ENGINEERING

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Course Code	PRINCIPLES OF COMMUNICATION SYSTEMS (BEC402)
CO1	Understand the principles of analog communication systems and noise modelling.
CO2	Identify the schemes for analog modulation and demodulation and compare their performance.
CO3	Design of PCM systems through the processes sampling, quantization and encoding.
CO4	Describe the ideal condition, practical considerations of the signal representation for baseband transmission of digital signals.
CO5	Identify and associate the random variables and random process in Communication system design
Course Code	**Control Systems (BEC403)**
CO1	Deduce transfer function of a given physical system, from differential equation representation or Block Diagram representation and SFG representation.
CO2	Calculate time response specifications and analyse the stability of the system.
CO3	Draw and analyse the effect of gain on system behaviour using root loci.
CO4	Perform frequency response Analysis and find the stability of the system.
CO5	Represent State model of the system and find the time response of the system
Course Code	**Communication Laboratory (BECL404)**
CO1	Illustrate the AM generation and detection using suitable electronic circuits.
CO2	Design of FM circuits for modulation, demodulation and noise suppression
CO3	Design and test the sampling, Multiplexing and pulse modulation techniques using electronic hardware.
CO4	Design and Demonstrate the electronic circuits used for RF transmitters and receivers.
Course Code	**OPERATING SYSTEM (BEC405C)**
CO1	Explain the goals, structure, operation and types of operating systems.
CO2	Apply scheduling techniques to find performance factors.
CO3	Explain organization of file systems and IOCS.
CO4	Apply suitable techniques for contiguous and non-contiguous memory allocation.
CO5	Describe message passing, deadlock detection and prevention methods.
Course Code	**Data Structures Lab using C (BECL456D)**
CO1	Develop proficiency in coding and debugging complex algorithms and data structures.
CO2	Acquire practical problem-solving skills by applying data structures and algorithms to real-world programming challenges.
CO3	Develop a C program to perform arithmetic operation using data structure and operators.

CO4	Understand the concept of graph theory and develop a C program for searching an element.
CO5	Develop a C program to check the given graph is connected using different algorithms.
Course Code	**Technological Innovation and Management Entrepreneurship (BEC501)**
CO1	Understand the fundamental concepts of Management and Entrepreneurship and opportunities in order to setup a business
CO2	Describe the functions of Managers, Entrepreneurs and their social responsibilities
CO3	Understand the components in developing a business plan, along with the integration of CSR-Corporate Social Responsibility.
CO4	Describe the importance of small scale industries in economic development and institutional support to start a small scale industry and understand the concepts of Creativity and Innovation and Identification of Business Opportunities.
CO5	Awareness about various sources of funding and institutions supporting entrepreneurs
Course Code	**Digital Signal Processing (BEC502)**
CO1	Analyse the different types of signals and systems used in digital signal processing
CO2	Compute the response of an LTI system using time and frequency domain techniques.
CO3	Develop algorithms for the efficient computations of DFT and IDFT.
CO4	Design of digital FIR filters for the given specifications using different window methods.
CO5	Design of digital IIR digital filters using bilinear transformation method.
Course Code	**DIGITAL COMMUNICATION (BEC503)**
CO1	Apply the concept of signal conversion to vectors in communication transmission and receiption
CO2	Perform the mathematical analysis of digital communication systems for different modulation techniques.
CO3	Apply the Source coding and Channel coding principles for the discrete memoryless channels.
CO4	Compute the codewords for the error correction and detection of a digital data using Linear Block Code, Cyclic Codes and Convolution Codes.
CO5	Design encoding and decoding circuits for Linear Block Code, Cyclic Codes and Convolution Codes
Course Code	**Satellite and Optical Communication (BEC515D)**
CO1	Describe the satellite orbits and its trajectories with the definitions of parameters associated with it.
CO2	Describe the Electronic hardware systems associated with the satellite subsystem and earth station.

CO3	Describe the communication satellite with the focus on national satellite system.
CO4	Classification and characterization of optical fibers with different modes of signal propagation.
CO5	Describe the constructional features and the characteristics of optical fiber and optical devices used for signal transmission and reception.
Course Code	**Digital Communication Lab (BECL504)**
CO1	Design the basic digital modulation and demodulation circuits for different engineering applications.
CO2	Design of optimum communication receivers for AWGN channels
CO3	Illustration of different digital modulations using the signals and its equivalent vector representations.
CO4	Implement the source coding and channel coding procedures using suitable software.
Course Code	**Embedded System Design (BEC601)**
CO1	Describe the architectural features and instructions of 32-bit microcontroller ARM Cortex M3.
CO2	Apply the knowledge gained for Programming ARM Cortex M3 for different applications.
CO3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
CO4	Understand the hardware software co-design and firmware design approaches.
CO5	Explain the need of real time operating system for embedded system applications.
Course Code	**VLSI Design and Testing (BEC602)**
CO1	Apply the fundamentals of semiconductor physics in MOS transistors and analyze the geometrical effects of MOS transistors
CO2	Design and realize combinational, sequential digital circuits and memory cells in CMOS logic.
CO3	Analyze the synchronous timing metrics for sequential designs and structured design basics.
CO4	Understand designing digital blocks with design constraints such as propagation delay and dynamic
CO5	Understand the concepts of Sequential circuits design and VLSI testing
Course Code	**Multimedia Communication (BCE613A)**
CO1	Understand the basics of multimedia Communication and applications
CO2	Analyze media types to represent them in digital form
CO3	Apply the compression techniques on text, images, audio and video
CO4	Understand multimedia information networks.
Course Code	**Renewable Energy Power Plants (BME654B)**
CO1	Understand the need of renewable energy resources, historical and latest developments.
CO2	Describe the use of solar energy and the various components used in the energy production
CO3	Appreciate the need of Wind Energy and the various components used in energy generation and the classifications

CO4	Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and Applications
CO5	Understand the concept of Biomass energy resources and their classification, types of biogas Plants applications
Course Code	**VLSI Design and Testing LAB (BECL606)**
CO1	Design and simulate combinational and sequential digital circuits using Verilog HDL.
CO2	Understand the synthesis process of digital circuits using EDA tool.
CO3	Perform ASIC design flow and understand the process of synthesis, synthesis constraints and evaluating the synthesis reports to obtain optimum gate level netlist.
CO4	Design and simulate basic CMOS circuits like inverter, NOR gate and any Boolean expression .
CO5	Perform RTL_GDSII flow and understand the stages in ASIC design.
Course Code	**IoT (Internet of Things) Lab (BEC657C)**
CO1	Explain the Internet of Things and its hardware and software components.
CO2	Interface I/O devices, sensors & communication modules.
CO3	Remotely monitor data and control devices.
Course Code	**Microwave Engineering and Antenna Theory (BEC701)**
CO1	Describe the use and advantages of microwave transmission
CO2	Analyze various parameters related to transmission lines
CO3	Identify microwave devices for several applications.
CO4	Analyze various antenna parameters and their significance in building the RF system.
CO5	Identify various antenna configurations for suitable applications.
Course Code	**COMPUTER NETWORKS & PROTOCOLS (BEC702)**
CO1	Understand the concepts of networking thoroughly
CO2	Identify the protocols and services of different layers.
CO3	Distinguish the basic network configurations and standards associated with each network.
CO4	Discuss and analyze the various applications that can be implemented on networks
Course Code	**Wireless Communication Systems (BEC703)**
CO1	Describe the wireless channel models for slow and fast fading environment
CO2	Understand the different multiple access technologies used in wireless communications.
CO3	Understand the system architecture and the functional standard specified in LTE 4G.
CO4	Describe the of MIMO transmitter and receiver process using coding examples
Course Code	**Computer and Network Security (BEC714B)**
CO1	Explain the various types of attacks on computer and network security from malicious logic and intruders.
CO2	Explain how to analyze the various vulnerabilities in the system which can compromise the security
CO3	Explain how auditing is essential to detect intrusion or suspicious activities in the system.
CO4	Explain the process involved to provide security with respect to network, system, user and program.

Course Code	**CONSERVATION OF NATURAL RESOURCES (BCV755B)**
CO1	Apprehend various components of land as a natural resource and land use planning.
CO2	Know availability and demand for water resources as applied to India.
CO3	Analyse the components of air as resource and its pollution.
CO4	Discuss biodiversity & its role in ecosystem functioning.
CO5	Critically appreciate the environmental concerns of today